

REMARKS

This application was refiled as a CPA on February 28, 2001, in response to the Office Action dated August 30, 2000. Claims 1-46 are now presented for examination. Claims 14-17 have been amended as shown above.¹ Claims 18-46 have been added to provide Applicants with a more complete scope of protection.

Claims 1, 2, 14-19, and 30-33 are the only independent claims.

In the Office Action dated August 30, 2000, Claims 1-5 and 11-17 were rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,034,478 (Kawade et al.), Claims 1-5 and 11-17 were rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent Application No. Hei 09-298029, Claims 9-12 were rejected under 35 U.S.C. 103(a) as being unpatentable over either Japanese Patent Application No. Hei 09-298029 or Kawade et al. in view of European Patent Application EP 0 769,796 A1 (Taiko et al.), and Claims 6-8 were rejected under 35 U.S.C. 103(a) as being unpatentable over Kawade et al. and Taiko et al. in view of Japanese Laid Open Patent Application No. Hei 08-031311 (Ono et al.).

^{1/} The changes made to Claims 14-17 have not been made for purposes related to patentability.

Applicants offer the following comments with regard to these rejections.

Independent Claim 1 is directed to a method for producing an electron-emitting device including a plurality of electrodes and an electroconductive film having an electron-emitting region. The film extends between the plurality of electrodes, and the electron-emitting region is formed by the steps of heating the electroconductive film, and energizing the electroconductive film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film.

Independent Claim 2 is directed to a method for producing an electron-emitting device including a plurality of electrodes and an electroconductive film having an electron-emitting region. The film extends between the plurality of electrodes. The electron-emitting region is formed by the steps of providing an electroconductive film, and energizing the electroconductive film while heating the film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film.

Kawade et al. and Japanese Patent Application No. Hei 09-298029 refer to an electroconductive film that is subjected to energization within an atmosphere for promoting cohesion of the electroconductive film. As a pulse voltage

is applied between device electrodes to cause electric current to flow through the electroconductive film, heat is thermally generated in the film itself as a result of that energization of the film.

In Applicants' view, while Kawade et al. and Japanese Patent Application No. Hei 09-298029 may refer to a film in which heat is thermally generated as a result of the film being energized, and while those references may be well-suited for their intended purposes, nothing in either of those references would teach or suggest forming an electron-emitting region by performing separate steps of heating an electroconductive film and energizing the electroconductive film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film, as recited in Claim 1, or forming an electron-emitting region by energizing an electroconductive film while separately heating the film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film, as recited in Claim 2.

For these reasons, Claims 1 and 2 are believed to be clearly patentable over Kawade et al. and Japanese Patent Application No. Hei 09-298029.

Independent Claims 14 and 15 each recite features that are similar in many relevant respects to those of Claim 1 discussed above, and independent Claim 16 recites features

that are similar in many relevant respects to those of Claim 2 discussed above, and also are believed to be clearly patentable over Kawade et al. and Japanese Patent Application No. Hei 09-298029 for the same reasons as are those respective independent Claims 1 and 2.

Independent Claim 18 is directed to a method for producing an electron-emitting device, and recites, in part, energizing an electroconductive film while heating the electroconductive film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film, wherein, after the start of the energizing and the heating, the atmosphere including the gas for promoting cohesion of the electroconductive film is provided. For substantially the same reasons as those given above, Applicants respectfully submit that neither Kawade et al. or Japanese Patent Application No. Hei 09-298029 teaches nor suggests those features of Claim 18, and thus that claim also is deemed to be clearly patentable over those references.

Independent Claim 19 is directed to a method for producing an electron-emitting device that includes a substrate, a plurality of electrodes, and an electroconductive film having an electron-emitting region. The electron-emitting region is formed by the steps of heating to a predetermined temperature the substrate on which

the electroconductive film is disposed, energizing the electroconductive film, wherein the energizing starts after the predetermined temperature is reached, and controlling an atmosphere in which the heating and energizing steps are performed so that the atmosphere is set to one comprising a gas for promoting cohesion of the electroconductive film during the performance of the heating and energizing steps.

As noted above, Kawade et al. and Japanese Patent Application No. Hei 09-298029 each refer to a film in which heat is thermally generated as a result of the film being energized. However, in Applicants' view, nothing in either of those references would teach or suggest the features of Claim 19 relating to separate steps of heating to a predetermined temperature a substrate on which an electroconductive film is disposed, and energizing the electroconductive film, wherein the energizing starts after the predetermined temperature is reached. Accordingly, Claims 19 is deemed to be clearly patentable over those references.

Independent Claims 30-33 each recite separate steps of heating a substrate on which an electroconductive film is disposed, and energizing the electroconductive film, and also are believed to be clearly patentable over Kawade et al. and

Japanese Patent Application No. Hei 09-298029 for substantially the same reasons as is Claim 19.

A review of the other art of record has failed to reveal anything which, in Applicants' opinion, would remedy the deficiencies of the art discussed above, as references against the independent claims herein. Those claims are therefore believed patentable over the art of record.

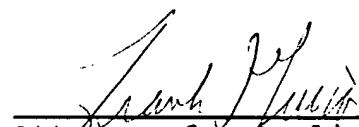
The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, however, the individual consideration or reconsideration, as the case may be, of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All

correspondence should continue to be directed to our below
listed address.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

14. (Amended) A method for producing an electron source having a plurality of electron-emitting devices, comprising the steps of:

forming a plurality of electron-emitting devices by a method including the steps of:

heating an electroconductive film; and

energizing the electroconductive film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film[; and

assembling the plurality of electron-emitting devices into an electron source].

15. (Amended) A method for producing an image-forming apparatus comprising (a) an electron source having a plurality of electron-emitting devices and (b) an image-forming member for forming an image under irradiation of electrons from the electron source, the method comprising the steps of:

forming a plurality of electron-emitting devices by a

method including the steps of;

heating an electroconductive film; and

energizing the electroconductive film in an atmosphere comprising a gas for promoting cohesion of the electroconductive film[;

assembling the plurality of electron-emitting devices into an electron source; and

incorporating the electron source into an image-forming apparatus].

16. (Amended) A method for producing an electron source having a plurality of electron-emitting devices, comprising the steps of:

forming a plurality of electron-emitting devices by a method comprising the steps of:

providing an electroconductive film; and

energizing the electroconductive film, while heating the film, in an atmosphere comprising a gas for promoting cohesion of the electroconductive film[; and

assembling the plurality of electron-emitting devices into an electron source].

17. (Amended) A method for producing an image-forming apparatus comprising (a) an electron source having a plurality of electron-emitting devices and (b) an image-forming member for forming an image under irradiation of electrons from the electron source, comprising the steps of:

forming a plurality of electron-emitting devices by a method including the steps of:

providing an electroconductive film; and
energizing the electroconductive film, while heating the film, in an atmosphere comprising a gas for promoting cohesion of the electroconductive film[;

assembling the plurality of electron-emitting devices into an electron source; and

incorporating the electron source into an image-forming apparatus].